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Circular Letters:

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Intravenous Administration of Procaine Hydrochloride During General Anesthesia: The authors' interest in this procedure was stimulated by the report of Bittrich and Powers, who used one percent procaine hydrochloride solution intravenously during anesthesia and operation. They reported that it produced a depression of the cough reflex, decreased cardiac irritability and resulted in an inhibition of sweating. Although the authors have administered procaine in this way to approximately 400 patients, only a few more than 200 of the cases have been carefully analyzed.

Although procaine hydrochloride intravenously can be used with almost any type of general anesthesia, use of the drug by the authors has been limited to about 3 combinations. The first, and most frequently used method, consists of induction with pentothal sodium, with or without curare, usually followed by tracheal intubation and a continuous flow of nitrous oxide and oxygen plus the intravenous administration of procaine hydrochloride throughout the anesthesia. This combination is frequently used in thoracic surgery, either for operation on the thoracic cage or for transthoracic work. Another combination is the use of cyclopropane combined with administration of procaine intravenously. In still fewer instances, the authors have administered procaine intravenously in combination with ether anesthesia. It may be less important with ether, a drug which is efficient in depressing troublesome reflexes itself. However, with procaine, one may maintain much lighter ether anesthesia and prevent excessive saturation of the tissues during a prolonged anesthesia.

The technic consists in making 500 or 1,000 cc. of one percent procaine hydrochloride in 5 percent dextrose solution by dissolving one Gm. of sterile procaine hydrochloride crystals in each 100 cc. of the infusion fluid to be used. This must be well shaken to insure that the crystals are dissolved completely. This is administered through a needle separate from all other fluids, in order that its rate can be carefully controlled. The rate is determined by counting the number of drops per minute, made possible by an ordinary dropper in the intravenous tubing. Administration of procaine is usually started shortly after surgical anesthesia has been produced by the principal drug, and the flow is started at a rate of from 30 to 60 drops per minute, which amounts to from 2 to 4 cc. per minute (from 20 to 40 mg. of procaine hydrochloride per minute). When pentothal sodium is used for induction, there is no need for rapid rates of flow early in the anesthesia in most circumstances but it may be necessary to increase the rate as the effect of the pentothal sodium decreases. The blood pressure must be watched carefully, and severe drops of pressure, regardless of the cause, indicate the necessity to decrease or stop the flow of procaine until the cause of the drop in blood pressure has been determined and corrected. An average rate of from 2 to 4 Gm. an hour for administering intravenous procaine in this procedure is usually sufficient.

Clinical observation has revealed the following desirable effects from procaine during various types of anesthesia: (1) without otherwise deep anesthesia, the cough reflex is depressed even when an endotracheal airway is in place or there is manipulation within the pleural cavity. On many occasions severe bucking has been controlled by procaine alone without interference with the patient's breathing. (2) It has been effective in preventing cardiac arrhythmias during most intrathoracic operations with cylcopropane. Again, this effect is not absolute but represents a markedly depressing effect on the cardiac irritability. (3) Sweating is inhibited; the skin remains warm and dry; occasionally the hands will be cool and dry. For the most part, this is a desirable action; however, it is possible that during hot weather depression of sweating will not be desirable. (4) The entire respiratory tract is usually very dry, and excessive salivation, nausea, retching and vomiting during recovery are very rare. The patients can retain fluids by mouth as soon as desired after recovery. (5) Intravenous administration of procaine is helpful in maintaining light anesthesia with any anesthetic drug, probably because of the drying of secretions, control of the cough reflex and the production of some analgesia. Many trials have demonstrated that it plays a part in maintaining anesthesia with light levels of surgical anesthesia. (6) It results in postoperative analgesia for from 20 minutes to several hours, thus accounting in large measure for the recovery to consciousness without excitement. This has been particularly noticeable in patients recovering from cyclopropane. (7) The results in some types of operations are striking enough to be appreciated by both the anesthesiologist and the surgeon. The patients have been well pleased.

The disadvantages and dangers of intravenous administration of procaine hydrochloride are the following: (1) it increases the technical aspect of anesthesia by necessitating a separate infusion set and needle with careful control of the rate of flow. At the present time, procaine crystals may be obtained in 5 Gm. vials, and it is hoped that in the future procaine in solution may be available to avoid the necessity of dissolving crystals. (2) The greatest danger in the intravenous use of procaine is the possibility of circulatory depression, which may occur rather rapidly in the case of an overdose. If pentothal sodium is being used, this may occur without the presence of any convulsive manifestations. If cyclopropane is being used, this drop in blood pressure is rarely seen because convulsive manifestations usually occur before the circulatory depression. It is best to limit the rate of flow to from 4 to 5 cc. per minute for an average adult and less for elderly patients. (3) The possibility of convulsive phenomena is always present; however, because the authors watch the patient constantly, they have no great fear of this complication because it can be controlled either by intravenous administration of a barbiturate or by decreasing the rate of flow of procaine. Practically always it is preceded by facial twitching. Only once in 200 cases was pentothal sodium given to control a convulsion. (4) There may be other dangers involved which the authors have not yet encountered, such as

damage to parenchymatous organs or other tissue cells. Frequently, it takes several hundred cases to discover rarely occurring damage of this sort. To date, the authors have not observed any, in spite of fairly large doses to some patients.

There are 3 general types of operation in which procaine has been found the most advantageous. The first is thoracic or transthoracic operations; the authors have found it beneficial in depressing the periosteal and laryngeal reflexes, in depressing the cough reflex, in drying up secretions of the respiratory tract and also in providing postoperative analgesia. For intrathoracic operations it has been helpful in depressing cardiac irritability, but it has not been found that it is absolute in blocking vagovagal reflexes. A second type of operation in which it has been found useful is in anesthesia for thyroidectomy. Although the anesthesia for thyroidectomies does not present as serious problems as before the days of propylthiouracil, one can readily appreciate the stabilizing effect of intravenously administered procaine during this type of operation; the recovery has been smoother, and one is led to believe that in a thyroid crisis intravenous procaine might well be used. The third group comprises operations of a superficial nature in which light anesthesia is adequate for the operative procedure. Such an operation can be performed either with or without an endotracheal airway when procaine is administered. In these patients, smaller amounts of procaine are used.

The use of one percent procaine hydrochloride intravenously during general anesthesia has a definite value in a certain type of anesthesia. The chief danger is circulatory depression caused by an overdose. This potential hazard may prove to be of sufficient magnitude to preclude the use of this drug in sufficient quantity to be of value. At the present time it appears that the use of a sufficient quantity to assist in producing anesthesia places the method in the same category as the administration of deep cyclopropane or chloroform anesthesia as far as the alertness necessary in watching the circulation is concerned. Lower and safer doses are of benefit in depressing some reflexes and are preferred in the light of the experience to date. Hence, 4 cc. per minute is the maximum for young adult patients, and not more than half that amount should be given to elderly patients. The effect it may have in preventing edema under casts or in the operative field has not been studied but has been suggested by Gordon. It has been appreciated for some time that most drugs that produce general anesthesia are lacking in power to depress certain reflexes and functions, even though in most respects they are highly desirable. Ether is one drug that in higher concentrations depresses nearly all reflexes, and its over-all safety is recognized, but it is not pleasant for most patients and disturbs metabolism considerably. It is possible that better anesthesia will be possible with drugs like nitrous oxide and pentothal sodium if procaine can be safely administered by the intravenous route. (Arch. Surg., Sept. '49, I. B. Taylor et al.)

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The Transpleural Endoscopic Approach to the Autonomic Nervous System and Its Therapeutic Possibilities: Operations on the thoracic sympathetic chain, as in hypertension for example, can be performed simply and without operative risk via the pleural cavity. After the induction of a pneumothorax, the entire sympathetic trunk from the caudal portion of the stellate ganglion down to its passage through the diaphragm including its branches to the splanchnics and the rami communicantes can be seen easily with a thoracoscope shining through the parietal pleura. Although every anatomical atlas shows these topographical relations, until now this simple route has not been described. After death the parietal pleura quickly thickens and clouds like the cornea so that in the cadaver in which new operative procedures are usually tried the vagus and sympathetic nerves are no longer clearly seen. On the other hand, in open thoracotomies the reflex hyperaemia and the brilliant lighting of the operative field obliterates nuances. This may appear paradoxical, but it is the endoscopic illumination that brings out in rich contrast and relief the vegetative nervous system. By means of a thoracoscope and through either one or 2 openings in the thorax, the sympathetics can be injected or divided by cautery at any given point above the diaphragm. With a suitable instrument exeresis can be done and the nerves from below the diaphragm evulsed. This is not true of the vagus. The upper half is approachable with a direct optic and cautery. The lower half can be reached only at certain points and then with a 90 degree or 135 degree optic and a curved cautery.

In a series of 200 operations no complications were observed, with the exception of 3 intercostal neuralgias. The procedure is so easily performed that in some patients on the same day and even in the same hour the operation can be done first on the one and then on the other side. The advantages of the endoscopic method are: (1) there is practically no operative risk, and (2) the procedure can be repeated. For example, a preliminary novocaine block can be done, the therapeutic effects studied, and after several days or weeks, a permanent interruption performed. Again as in hypertension with renal involvement, the first intervention (on the splanchnicus) eliminates the vasoconstriction of the kidneys. After an improved renal blood flow and function, the second intervention against the sympathetic can be carried out if necessary. (3) The operation can be performed with a certainty of exact localization, without general anesthesia, and without preliminary sedation, so that many new physiopathologic observations are possible.

The author states that in this short communication no discussion can be made of the uses of this method in such conditions as hypertension, diseases of the liver and biliary tract, the pancreas, the spleen and hemopoietic system, circulatory disturbances, bronchial asthma, and pulmonary tuberculosis. The author also states that in the treatment for peptic ulcer he and his co-workers interrupt the sympathetic and not the vagus. This treatment will be discussed in another communication. (Dis. Chest, Nov. '49, E. Kux, Surgical Clinic, Univ. of Innsbruck, Innsbruck, Austria)

Relief of Chest Pain by Tetraethylammonium Chloride: The intravenous administration of tetraethylammonium chloride to a patient acutely ill with thrombophlebitis and pulmonary infarction unexpectedly relieved the patient's severe pleuritic pain. As a result of this observation, the effect of tetraethylammonium administration has been studied in other patients with chest pain. The present report concerns observations made on 35 male and 5 female patients with chest pain associated with infarction, trauma, pneumonia, pleuritis, tuberculosis, neoplasm, mediastinal emphysema, or myocardial infarction.

Tetraethylammonium chloride was given intravenously, each cubic centimeter of solution containing 100 mg. of the drug. Syringe injection was made slowly, while the blood pressure was being measured in the other arm; administration was suspended if the diastolic blood pressure fell, and was resumed as the pressure rose. Only in older and in debilitated patients was there usually a marked fall in blood pressure. Originally, an effort was made to give each patient 3 or 4 cc. of solution (from 300 to 400 mg.). These amounts were well tolerated by young patients with acute illnesses, but in others the fall in blood pressure often permitted injection of only 2 or 3 cc. More recently, a smaller dose of 3 mg. per kilogram of body weight has been employed. No severe reactions have been encountered, and in no case has it been necessary to use neostigmine for the control of circulatory collapse. Patients were kept in a recumbent position for 30 minutes after administration of the tetraethylammonium chloride to avoid symptoms caused by postural hypotension.

In all patients a diminution of pain was noted. In some patients the effect was slight, being manifested chiefly by ability to breathe more deeply; in others the relief was considerable although brief in duration, but in the majority relief was marked and prolonged. The results are summarized in the table below.

Cause of Pain	No. of Patients	Slight or Moderate Relief	Marked Relief
		no. of cases	no. of cases
Pulmonary infarction	8	2	6
Trauma	15	4	11
Pneumonia and pleuritis	8	4	4
Tuberculosis	5	4	1
Neoplasm	2	1	1
Mediastinal and cardiac disease	2	0	2
Totals	40	15	25

Included as having experienced marked relief are patients who were completely free for at least 4 hours; the majority of patients included in this group obtained relief for considerably longer periods, and in most patients the pain did not recur in its original intensity. The degree and duration of relief seemed to be influenced by the age of the patient as well as by the nature of the lesion responsible for the pain. Patients less than 50 years of age obtained satisfactory relief more often than older patients, but relatively few older persons were treated because of reluctance to use this drug in patients with degenerative changes. Application of the chi-square test failed to demonstrate a significant difference between the results in the 2 age groups; this may have been partly the result of the small number of older patients, and additional studies will be required before definite conclusions concerning the effect of age can be drawn.

This action of tetraethylammonium chloride upon pleural and mediastinal pain apparently has not been previously reported. Lyons and his associates noted dramatic relief of pain in 2 patients with acute myocardial infarction who were given tetraethylammonium chloride, but these investigators considered that the drug was contraindicated in the presence of coronary-artery disease. More recently, Shea and his co-workers have reported the use of tetraethylammonium chloride for relief of cardiac pain in 16 patients with myocardial infarction or coronary insufficiency, and Christy has studied intramuscular administration of this drug for treatment in angina pectoris.

The pharmacologic and physiologic implications of these observations are of considerable interest. The action of tetraethylammonium chloride is not that of a general analgesic; during its action thoracic skin sensitivity to painful stimuli is not diminished. Tetraethylammonium chloride is known to exert appreciable psychic side effects, and a psychogenic influence cannot be excluded in the patients who appeared to obtain slight or even moderate relief of chest pain after its use. It is unlikely, however, that the complete relief occurring in patients severely ill with definite organic lesions can be considered psychogenic, especially because in many patients injections of morphine and procaine had previously been ineffectual. In fact, the action of tetraethylammonium chloride was most striking in patients who manifested the least psychologic and physiologic disturbance.

The mode of action of tetraethylammonium chloride in relieving chest pain is not clear. Capps demonstrated that pain can be elicited by trauma to the parietal but not to the visceral pleura. The belief that pleural pain is caused by irritation or inflammation of the parietal pleura and is carried through sensory fibers of the intercostal nerves has been questioned by Price, who pointed out that intercostal-nerve blocks with procaine relieved pleuritic pain for much longer intervals than were attributable to the anesthetic action of procaine. Bennett and Latham offered as an explanation the theory that the pain of pleurisy, like the pain of a sprained ankle, is caused by muscle spasm, and postulates that a vicious circle was thereby initiated so that temporary interruption of the chain by the anesthetic action of procaine resulted in a prolonged relief. Their observation that intravenous calcium administration and curare were effective in alleviating pleuritic pain supported this theory. If pleural pain is the result of intercostal muscular spasm, the effect of tetraethylammonium chloride might be caused by its curare-like activity, which, however, is exerted not by a curarizing action at the myoneural junction of skeletal muscles, but by a blocking effect at the ganglionic synapse. In addition to an action on a hypothetical muscle spasm, it is necessary, to explain the relief of cardiac pain, to postulate, as Shea et al. have done, an action upon coronary-artery spasm. This does not appear to be an adequate explanation for the effect of tetraethylammonium chloride upon pain associated with acute myocardial infarction, and the possibility should be considered that the relief of chest pain by tetraethylammonium chloride is the result of a direct action on

sensory pathways, interrupting afferent flow either at nerve ending, at synapse, or centrally. Evidence suggesting a direct action upon sensory pathways has recently been provided by the observation of Sonnenschein, Jenny, and Pfeiffer that alterations in pain thresholds of the finger pads and nail beds are produced by administration of tetraethylammonium chloride.

The cardiovascular effects of tetraethylammonium chloride limit the application of the drug for relief of chest pain, especially in older patients. Tetraethylammonium chloride is a drug that must be used with caution in patients with hypertension or arteriosclerosis, and should not be used in patients with high diastolic pressures or impaired renal function. The alarming or fatal reactions reported have followed use of high dosages or rapid administration, although a profound reaction occurred in a young woman after injection of only 230 mg. Serious reactions appear to be infrequent, however, when small doses are administered with care. Naide has observed no severe reactions in the course of 1000 injections in ambulatory patients. He administered 200 mg. or less in patients under 50 years of age, but determined the dosage in patients over the age of 50 by response to a test injection of 50 mg.

The authors consider that there is very little danger in the use of tetraethylammonium chloride in hospital patients free of advanced renal or cardiovascular disease when used at the rate of 3 mg. per kilogram of body weight. An analgesic agent that does not, like morphine, suppress cough and encourage atelectasis, is of value, especially in patients with pulmonary disease. Tetraethylammonium chloride in low dosage provides a method of treatment worthy of trial in patients with severe chest pain not relieved by small doses of codeine or meperidine. (New England J. Med., 10 Nov. '49, H. L. Israel et al.)

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Acute Gangrenous Cholecystitis: Gangrene of the gallbladder constitutes a complete necrosis of a portion of the wall in one or more areas; it is frequently followed by perforation. This paper is a report of 100 consecutive cases of acute gangrenous cholecystitis (at the Boston City Hospital) in which the character of the gallbladder was described adequately by the surgeon, or the specimen was reported upon clearly by the pathologist, or the patient ultimately came to post-mortem examination. The pathological entity had to be quite precisely defined in order to be included in this series. In cases in which a cholecystostomy only was done, the character of the gallbladder had to be adequately described at some length so that no confusion regarding the nature of the lesion existed.

Attacks of acute biliary colic result from obstruction of the cystic duct, usually by a stone instead of by any primary inflammatory condition. Irrespective of what creates the first obstruction, it is apparent that profound vascular

and lymphatic stasis may occur so abruptly that virtual infarction ensues. Acute obstruction leads to increased intravisceral tension, and colicky pain results from the strenuous efforts of the muscular gallbladder to empty itself. This increased pressure results in an interference with the blood supply and the lymphatic drainage, and this in turn may be followed by the development of gangrene of the organ, usually beginning in the fundus because that portion is farthest from the source of blood supply, or the stone itself may erode the edematous gallbladder wall. The course of events then leads to perforation of the viscus. According to Hallendorf and his co-workers, histologic evidence indicates that circulatory disturbance plays the most important role in the pathogenesis of gangrenous cholecystitis, and late evidence of infection plays a rare and lesser role. Necrosis, engorgement of the venous and lymphatic systems, intramural hemorrhage and edema, with mucosal desquamation, fibroblastic activity and early lymphocytic infiltration followed by a late invasion of polymorphonuclear cells were the consistent microscopical features in their series. It is interesting that when operation was done within the first 24 hours of the onset of an attack, extensive edema and marked venous congestion were characteristic features.

Fifty-four females and 46 males comprised this series, a sex distribution quite distinct from that in acute cholecystitis, which occurs 5 times as frequently in females. Eighty-six of these patients were over the age of 50. Again, this is in marked contrast to the age distribution in acute cholecystitis, which occurs in general in a younger age group. Of the 100 patients, 72 entered the hospital during the first week of their illness. A history of chronic gallbladder disease was present in 90 cases. In the remaining 10 cases a history of previous attacks was not obtained either because of the advanced age or the moribund state of the patient, or because it did not exist.

Of the 100 patients, 96 (all whose statements on this point were considered to be reliable) complained of abdominal pain, and 82 were able to localize this pain to the right upper quadrant. In only 26 patients was the usually described radiation of pain to the right subscapular area elicited. The remaining 14 could not localize their pain but complained of pain all over the abdomen; 62 of the patients were nauseated, and 60 vomited one or more times during the course of their present illness. Chills and fever were found in only 7 cases. Right-upper-quadrant tenderness was demonstrated in 82 patients, and was the most prevalent sign; generalized abdominal tenderness was found in an additional 15. A right-upper-quadrant mass was found in 61 patients; this was much more frequent than in other series. Twenty-seven patients showed varying degrees of distention as noted by the admitting physician. This finding is stressed because the presence of distention in several patients was responsible for shifting the suspicion of disease from the gallbladder to another and innocent organ. In this regard, gallstone ileus, the result of perforation of the gallbladder into the intestinal tract, has received widespread attention in the literature. Blain and Harkins, in their

series of 41 cases of gallbladder perforation, had 11 cases (or 27 percent of the series) associated with signs of intestinal obstruction; however, only 5 of these 11 patients were examples of classic gallstone ileus; the other 6 were produced by perforation with resulting inflammatory or paralytic ileus or mechanical obstruction as by adhesions. In this series there were 4 cases of proved gallstone ileus, and 23 cases of paralytic ileus produced in a fashion comparable to that described in the last group of Blain and Harkins. Distention, then, on either basis is not uncommon in gangrenous cholecystitis.

Jaundice was present in only 9 patients and was of little diagnostic significance in this condition. The majority of patients (69) had white-cell counts ranging from 10,000 to 25,000. The temperature and pulse ranges are shown in the table below.

Temperature °F.	No. of Cases	Pulse	No. of Cases
98.6-99	29	60-80	17
99.2-100	25	81-90	25
100.2-1vi	18	91-100	38
101.2-102	22	101-120	18
102.2-103	3	121-140	2
103.2-104	3		
Totals	100		100

Eighty-five patients had perforations at the time of examination, or evidence of previous perforation such as localized abscesses, gallstones within the lumen of the intestine, stones free in the abdominal cavity, free generalized peritonitis and multiple and recent adhesions indicative of recent perforation. Eighty-five patients showed peritonitis, and in 23 patients in this group a generalized peritonitis was observed. The remaining 62 patients had well demonstrated evidence of the body's attempts to restrict the spread of infection, such as adhesions or omentum walling off the perforated viscus and resulting in a localized type of peritonitis. Acute free perforation carries a mortality 3 times that of localized peritonitis. Fortunately, free perforation is less frequent than localized peritonitis. This is explained on the basis of the position of the gallbladder sheltered as it is by the liver, because of the inherent distensibility of the organ, and because the omentum is accessible and readily mobilized to envelop the affected viscus. For these reasons acute gangrenous cholecystitis is not an emergency of the high order of acute appendicitis. Nevertheless, free perforation occurred often enough in this series to warrant its serious consideration by the attending surgeon in deciding to operate.

Stones were present in 89 patients in this series. Ninety-eight percent of the Mayo Clinic Series showed stones in the gangrenous gallbladder or cystic duct, and Hallendorf points out that this high percentage was the result of a careful search of the edematous and distorted specimen for stones which had been overlooked by the surgeon or the pathologist on the day of operation. It is the author's impression that the more carefully the specimen is searched for stones, the more frequently they will be discovered. Most investigators agree that gangrene and perforation rarely occur except in association with stones.

Several striking facts appear in the figures for mortality in this series of 100 cases. Eight patients not coming to operation died; this figure may be misleading, for in a check of the records of these patients it is noted that at least 6 and possibly 7 were in extremis on entry, or had severe concomitant disease, and it appears in retrospect that the surgeons based their decision not to operate on the firm conviction that the patient was beyond human succor; 3 of these patients refused surgery.

Among the 47 patients operated on within the first 48 hours after the onset of their present illness, there were 5 deaths, 3 after cholecystectomy, and 2 after the less radical procedure of cholecystostomy, a mortality rate of 10.6 percent in this group. Among 40 patients who were operated upon after 48 hours following onset and up to the beginning of the third week, the rate for over-all mortality was 50 percent irrespective of the type of surgical procedure elected. Again, the mortality rate dropped appreciably in the group of patients coming to operation within the period from the third to the sixth week, with one death among 5 cases, a mortality rate of 20 percent. (New England J. Med., 27 Oct. '49, W. J. Clifford)

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Acute Hepatitis in General Hospital Practice: During the last few years, the number of blood and plasma transfusions given at The Johns Hopkins Hospital has risen sharply. It seemed of interest, therefore, to try to estimate the extent of the problem presented by homologous serum jaundice in hospital practice. The data obtained from the study emphasize the fact that, at present, homologous serum jaundice and acute infectious hepatitis cannot be distinguished on clinical grounds.

The histories were reviewed of all patients with hepatitis from any cause who were hospitalized at The Johns Hopkins Hospital between 1 January 1937 and 31 December 1948. Those patients with hemolytic or obstructive jaundice, amebic hepatitis, Weil's disease, hepatitis due to sulfonamides or cinchophen, or cirrhosis of the liver were eliminated from consideration. There remained 287 patients with acute infectious hepatitis or catarrhal jaundice, acute yellow atrophy of the liver, postarsphenamine hepatitis, and homologous serum jaundice. Which cases should be called homologous serum jaundice cannot be determined with certainty. Different authors give different estimates for the incubation period of this disease. These vary from about 2 weeks to 7 months. In the analysis which follows, any instance of hepatitis is called homologous serum jaundice if it appeared between 5 weeks and 5 months after the injection of human blood or its products. It is obvious that naturally occurring acute infectious hepatitis may have appeared in some patient following transfusion, and it is therefore impossible in any given instance to be certain of the route of infection.

Moreover, a review of the clinical and pathologic features of the cases of hepatitis studied demonstrated that they could not be satisfactorily differentiated. Although the cases designated as homologous serum jaundice were more severe than the average, no other essential difference was noted. In the group considered, regardless of the designation of the illness, most patients presented a relatively benign picture of abdominal complaints followed after several days by jaundice, light colored stools, and dark urine. Examination in the hospital disclosed that all the patients were jaundiced. Frequently the liver was palpable, and occasionally the spleen also. Ordinarily the process gradually subsided. Occasionally, however, the hepatitis was more severe, and 32 patients, 11.2 percent of the total, died. The high mortality rate may have been a result in part of the fact that only the more obviously ill patients with hepatitis were admitted to the hospital during most of the period of this study.

Except for the use of human volunteers, no method is available at present to study the etiology of acute infectious hepatitis. For this reason it is not possibel to state with certainty in any particular case that a causal relationship exists between the injection into a patient of human blood and the subsequent development of acute hepatitis. None the less, it is impressive that 14.0 percent of the patients admitted to The Johns Hopkins Hospital with acute hepatitis had received a transfusion between 5 weeks and 5 months before. This period of time is the same as the incubation period previously reported when hepatitis followed the injection of homologous blood in human subjects. Tentatively, then, these patients may be presumed to have had homologous serum jaundice.

Hepatitis after transfusion, as it was seen in the hospital, was a serious and often fatal disease. In the present series, 27.5 percent of these patients died. This fatality rate is comparable to that reported by others. For example, Sheinberg, Kinney, and Janeway observed that 4 of 11 patients with homologous serum jaundice after receiving a transfusion, died. And Snell, Wood, and Meienberg observed a fatality rate of 19 percent. The reported fatality rates may have been too high, because probably only the more severely ill patients were hospitalized. None the less, the disease appeared to be much more severe than the homologous serum jaundice which followed vaccination with yellow fever vaccine containing human serum. Very likely this difference resulted from the much larger inoculum of virus which occurred during blood transfusion. It is noteworthy that the fatality rate in the present series in patients who had had blood counts, venepunctures, or parenteral injections other than blood was no higher than in patients who had not received injections.

No estimate of the frequency of homologous serum jaundice was possible from the data available. However, in previously reported studies the proportion of patients transfused who subsequently developed hepatitis was high. For example, one in every 222 transfusions of blood or plasma at the Peter Bent Brigham Hospital was followed by hepatitis and one in every 21 patients receiving a transfusion with pooled plasma in upper New York State developed hepatitis. The data

suggest that homologous serum jaundice is a problem which is serious enough so that the indications for blood or plasma transfusions should be weighed carefully against the risks involved. Furthermore, the use of pooled plasma or multiple transfusions should be avoided whenever possible because the risk of transmitting homologous serum jaundice is proportional to the number of blood donors used.

It has been demonstrated repeatedly that acute hepatitis can be transmitted by minute quantities of infectious materials. A number of epidemics have been described in which hepatitis apparently resulted from the use of inadequately sterilized needles or syringes. In the present study, approximately 20 percent of cases of hepatitis, not following blood or plasma transfusions or injections of arsenical compounds, occurred in patients who had previously had a parenteral inoculation or test. In a control group of patients, the incidence of parenteral inoculation was only 8 percent. The probability that this difference could have occurred by chance is less than one in 100. The evidence indicates that injections of any variety or the withdrawal of blood should be made only with needles, syringes, or lancets which have been properly sterilized. The only practical agent known which will destroy the virus of hepatitis is heat. The inadvertent inoculation of patients with the virus of hepatitis may be avoided by boiling or autoclaving all needles, syringes, and lancets before their use in each patient. Sterilization with such agents as phenol, ether, and merthiolate has been shown to be ineffective. It would not be sufficient to boil or autoclave the needles and syringes used alone on patients with hepatitis. There is considerable evidence either that there are carriers of the virus, or that the virus is present in the blood both during the incubation period and subsequent to the disease.

No satisfactory evidence has been reported concerning whether infectious hepatitis and homologous serum jaundice are separate entities or variations of the same disease which depend on the route of infection. It is of interest that in this study the clinical, laboratory, and pathologic features of the patients with homologous serum jaundice did not differ from those of patients with acute hepatitis from other causes. The greater severity reported in post-transfusion hepatitis could well be explained by the dosage of the inoculum of virus.

The data presented indicate that acute hepatitis during pregnancy is frequently attended by abortion or premature delivery. (Bull. Johns Hopkins Hosp., Oct. '49, O. D. Ratnoff and G. S. Mirick)

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Study on the Cause of Death in Strangulation Obstruction of the Intestine: The mortality rate in acute intestinal obstruction has decreased from around 60 percent at the turn of the century to from 10 to 20 percent in the larger clinics at the present time. This decline in mortality, however, has been manifested

more in patients with simple obstruction than in patients with strangulation obstruction. In 1947, Eliason and Welty reported a mortality rate of only one percent in patients with obstruction not complicated by strangulation or carcinoma. On the other hand, even as late as 1940, Schlicke, Bargen and Dixon reported a mortality rate of 56 percent in patients in whom gangrenous bowel was found at operation, and even more recent reports showed a mortality rate of from 20 to 40 percent in a group of such patients. It is of particular interest to note that although at the present time interference with the circulation occurs in only from 17 to 33 percent of the total number of patients, the mortality rate ranges between 25 and 40 percent, and these cases account for more than half of the total deaths reported in the various series. The continued high mortality rate in patients with strangulation obstruction indicates that factors other than those amenable to the present improved methods of management exist in this condition.

The authors, working in the Harrison Department of Surgical Research, School of Medicine, and the Departments of Surgery and Physiological Chemistry, Graduate School of Medicine, University of Pennsylvania, Philadelphia, have investigated the problem of strangulation obstruction utilizing certain of the newer concepts of management in an attempt further to clarify the cause of death. Following the creation of a strangulated ileal obstruction in dogs, the animals were treated for hemorrhage, shock dehydration and electrolyte loss, and studies were made on the blood, peritoneal fluid, and gut contents, which included the following: specific gravities, proteins, urea nitrogen, nonprotein nitrogen, creatinine, uric acid, total nitrogen, amino acid nitrogen, amylase, lipase, chlorides, calcium, CO_2 combining power, pH, potassium, and spectrophotometric characteristics. The comparison of the absorption spectrum data upon the peritoneal fluid and gut contents with known hemoglobin derivatives was materially aided by reliable information upon the latter, available from extensive work in the laboratory of one of the authors.

That shock through the local loss of fluid may account for death in experimental long-loop strangulations is amply demonstrated. However, even with adequate treatment for shock, life is prolonged but little. That penicillin when combined with treatment for shock, dehydration, and electrolyte imbalance may prolong life in strangulation obstruction has been shown also and would indicate that bacteria or their products probably play a role in the cause of death; however, the protection afforded is limited, and the existence of some other lethal agent is further indicated by the series herein reported.

The studies of the authors have revealed that late in the course of strangulation obstruction in animals intensively treated to avoid hemorrhage, shock, dehydration, and electrolyte imbalance, the bowel wall becomes permeable to its intraluminal contents, and this fluid then passes out into the peritoneal cavity and then into the blood stream. The authors believe, as do others, that the pink peritoneal fluid is but a filtrate of the circulating blood. They also think that

the development of the reddish-black or black fluid results from filtration of the contents of the strangulated gut through the devitalized bowel wall into the peritoneal cavity. Even after the complete occlusion of the venous channels, evidence of permeability of the gut wall to its intraluminal fluid occurred in none of the test animals before 28 hours. This is longer than the length of survival of animals in which shock, dehydration and electrolyte balance have not been combatted. That this black fluid is a diluted counterpart of the gut contents is also shown and would be expected in view of the continued outpouring of the pink or plasma-like fluid from the peritoneal surfaces in the presence of a devitalized segment of intestine within the peritoneal cavity.

The death of the animal followed shortly after the development of the reddish-black or black fluid in the peritoneal cavity. In view of this fact and the known marked toxicity of the lumen contents, it would appear that some lethal factor was present in this later fluid. It is unlikely that the living bacteria or their end products are directly concerned with the death of the animal. Although it is true that the black fluid contained, qualitatively, the same organisms as did the lumen contents just before death, it must also be remembered that these same organisms were present in the pink fluid from around 16 to 20 hours onward, yet death did not occur until a short time after the development of the black peritoneal fluid. The important role of the organisms indirectly by their action on the devitalized mucosa, however, has been indicated by Sarnoff and Fine and Blain, et al., and it is likely that the prolongation of life in the penicillin-treated group of animals reported by Blain et al. resulted from the fact that the destructive action of the organisms on the bowel wall was delayed, thereby lengthening the time in which the gut became permeable to its intraluminal contents.

If it is true that a noxious agent formed in the gut and absorbed into the blood stream is the cause of death in these animals, then much clarification of the route of absorption is afforded by the studies of the authors. Although the characteristic luminal contents were present within the lumen as early as 12 hours, death did not occur until soon after the reddish-black or black fluid had appeared in the peritoneal cavity, and in no case were the authors able to demonstrate spectrophotometrically the hemin or hemoglobin derivative in the blood stream until after it had appeared in the peritoneal cavity. The absorption from the lymphatics of the strangulated gut would, therefore, appear to be negligible.

Although the characteristic absorption spectrum curve typifying black bowel contents and black peritoneal fluid has been defined, the identity of the pigment or pigments responsible for the abnormal spectrum has not been established. It remains for future investigation to establish whether the curve represents hemoglobin derivatives not hitherto described and originating from the blood pigment under the abnormal conditions in the strangulated bowel segment, or whether the spectrum is that of a mixture of common hemoglobin derivatives with less usual ones. Among the latter may be mentioned sulfhemoglobin

and prophyrins, both of which types of pigments could conceivably be formed in the intestine from hemoglobin. At present the authors have no evidence that either of such pigments is involved.

At this stage, the authors have no evidence whatever directly implicating the abnormal pigment or pigments with responsibility for the toxicity. Such close hemoglobin derivatives as methemoglobin are essentially nontoxic, and at present there is little evidence that other derivatives or relatives of hemoglobin may be toxic, with the possible exception of porphyrins. It is sufficient to state that the pigments responsible for the abnormal spectrum are contained in the black peritoneal fluid, characterize it, and give evidence for its intestinal origin. (Ann. Surg., Nov. '49, P. Nemir, Jr. et al.)

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Study on the Cause of Death in Strangulation Obstruction of the Intestine: In the first communication (foregoing article) it was shown that, late in the course of strangulation obstruction in dogs intensively treated for shock, dehydration, and electrolyte imbalance, the peritoneal fluid changed from a pink, odorless, coagulable fluid to a reddish-black or black, malodorous, noncoagulable fluid. In view of the rapid demise of the animal after the appearance of the black fluid in the peritoneal cavity and its rapid absorption into the blood stream, it seemed likely that some lethal factor was present in this fluid. This report is concerned with the injection intravenously and intraperitoneally into normal dogs of the fluid removed at various intervals from the peritoneal cavity of animals with strangulated intestine.

Normal, unanesthetized dogs were used as recipient animals. In no case was the circulating blood volume decreased before injection. The total amounts of fluid were delivered intraperitoneally between 2 and 8 hours. Intravenous injections were given either by rapid drip into a leg vein if the amount was large, or slowly by syringe injection if the amount was small. Following injection, the animals were carefully observed, and the temperatures were followed in a number of the dogs. Fluids from the peritoneal cavity were kept in the ice box at all times between sample collection and administration and warmed to room temperature just before administration. In all cases the fluid was injected unchanged within a few hours after collection. In those animals that appeared to be moribund, blood was taken for culture and for spectrophotometric analysis. All animals except one were examined immediately after death.

The injection of peritoneal fluid or gut contents from animals having a strangulation obstruction into normal animals has been used by many investigators as a method of determining the toxicity of these substances. Although the criteria for toxicity have varied, the peritoneal fluid, almost uniformly, has been shown to have essentially no effect on the recipient, even when injected

in amounts up to 200 cc., and the late gut contents have been shown almost invariably to cause death in such small amounts as several cubic centimeters. It is of interest to note, however, that Foster and Hausler injected from 80 to 100 cc. of loop fluid, filtered through sterile gauze only, from strangulated dogs dying between 7 and 12 hours, intraperitoneally into recipient animals without causing death.

In this study the criterion for toxicity of the peritoneal fluid was the death of the animal. Although occasional vomiting and diarrhea followed the injection of very large amounts of pink fluid, if death did not ensue the injection was recorded as having no effect. Obviously, the amount of fluid to be injected was, as in the past, purely arbitrary. However, the authors feel that much clarification of this point may be gained by (1) a comparison of the total amounts of pink fluid and reddish-black or black fluid injected, and (2) their spectrophotometric studies.

The pink, odorless, coagulable peritoneal fluid which was present up until several hours before death in the strangulated animals did not cause the death of the recipient in any of 6 animals injected either intraperitoneally or intravenously in amounts up to from 40 to 50 cc. per Kg. of body weight. The authors have injected intravenously as much as 425 cc. of this fluid into an animal over a period of one hour without any effects except a mild transient vomiting. In many cases this pink peritoneal fluid was withdrawn as late as from 24 to 28 hours after strangulation. It is of interest that the bacterial flora of this pink fluid was practically identical with the reddish-black or black fluid qualitatively and death was not caused by injection of the bacteria.

The animals that received the reddish-black or black fluid behaved in a different manner. Four of the 7 animals so injected died; one at 6 and one at 7 hours after intraperitoneal injection, and one at 5 hours and one at from 30 to 40 hours after intravenous injection. Another animal died 5 days after receiving reddish-black fluid intravenously. It was thought that the death of this animal was caused, at least in part, by distemper, and therefore it is not considered as one of the animals dying from the injection. It is true that large amounts (35 cc. per Kg.) of the black fluid were given intraperitoneally, but even these amounts were considerably less than the pink fluid given either intraperitoneally or intravenously. The reactions of the animals that died were similar in all cases whether the fluid was given intravenously or intraperitoneally. Up until approximately 2 hours after injection the animals appeared normal. After this period, however, their condition rapidly deteriorated, vomiting became more frequent and severe, and the animals were usually moribund several hours before death.

It was concluded that the toxicity of the peritoneal fluid samples removed in experimental strangulation obstruction bears a relationship of proportionality to its content of unidentified pigments responsible for the abnormal spectrum of

the black peritoneal fluid. It must be stressed that although the abnormal spectrum characterizes the toxic fluid, and, indeed, has served as a measure of the degree of toxicity of the fluid on injection into other animals, no evidence is at present at hand to identify the pigment itself as the toxic agent. (Ann. Surg., Nov. '49, P. Nemir, Jr. et al.)

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Dental Caries Control - Results of an Opinion Poll: The U. S. Naval Dental School, National Naval Medical Center, Bethesda, Maryland, has conducted a poll to determine the opinion of naval dental officers concerning the effectiveness of various caries-control measures, when these measures are applied to persons from 18 to 22 years of age, the average age of a naval recruit. Of 960 questionnaire cards sent out to dental officers on active duty, a total of 474 were returned, and of those returned 442 were properly filled in and were tabulated. The recipient of a card was to select 5 of the 20 caries-control measures listed, and mark his choices with numbers one through 5 in the order of their importance, the most important in his thinking being number one. In analyzing the returns it was felt that related control-measure choices should be combined into "schools of thought" wherever they represented the same idea with only a difference in method of application. Also, it appeared from the number of cards on which were omitted a fifth choice and those which omitted both a fourth and fifth choice, that there was a rapid decline in conviction once the respondent had made his first and second choices. It was therefore decided arbitrarily to weight the various choices of the caries-control measures on a 5, 4, 3, 2, 1 basis. Accordingly, the table on the opposite page shows 6 major caries-control measures accounting for about 96 percent (weighted) of the total score of the 442 valid, tabulated cards. Also shown is a seventh group, "All others," comprising the remaining 4.1 percent (weighted) of the total score. (These latter control measures, selected too few times to justify separate tabulation, are: vitamins, alkaline dentifrice and rinse, urea (alone) in any concentration, dibasic ammonium phosphate (alone), and the antibiotics.)

There is some justification for combining group I and group V in the table; this would, of course, accentuate the Oral Hygiene school.

The wide range of opinion regarding caries-control measures, shown in this survey, reflects strongly the diversity in current theories on the etiology of caries. (LCDR Fred L. Losee, DC, USN; LT Robert S. Leopold, MSC, USN; LTJG William J. Carter, DC, USN)

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TABLE

RATING OF CARIES-CONTROL MEASURES by FOUR HUNDRED FORTY-TWO NAVAL DENTAL OFFICERS

	SCHOOL OF THOUGHT (Subheads show each specific technique and its weighted[1] score)		TOTAL WEIGHTED[1] SCORE
I.	ORAL HYGIENE INHIBITS CARIES		2221
	1. Personal hygiene (tooth brushing)	1584	
	2. Professional prophylaxis	637	
II.	REDUCTION OF CARBOHYDRATES REDUCES CARIES		1770
	1. Reduction of refined carbohydrates	1369	
	2. Reduction of starch	401	
III.	FLUORIDES PREVENT SOME CARIES		845
	1. Fluorides 2% topical	499	
	2. Fluorides 1 ppm in water	346	
IV.	COMBINATIONS OF DIBASIC AMMONIUM PHOSPHATE AND UREA WILL PREVENT CARIES		716
	1. $(NH_4)_2 HPO_4$ 5% plus Urea 3-5%	388	
	2. $(NH_4)_2 HPO_4$ 5% plus Urea $22\frac{1}{2}\%$	328	
V.	MECHANICAL SURFACE PREPARATION HELPS DECREASE CARIES		469
	1. Prophylactic odontotomy	326	
	2. Polish roughened surfaces	143	
VI.	PROTEIN PRECIPITANTS AND/OR METAL PRECIPITATES WILL BLOCK ORGANIC ENTRY WAYS OF CARIES		301
	1. Silver nitrate topical	192	
	2. Protein precipitants	109	
VII.	ALL OTHERS		273

[1] Weighting: Each first choice was assigned a value of 5 points, each second choice 4, each third choice 3, each fourth choice 2, and each fifth choice 1.

Study on Burn Shock: Cope et al., working in the Surgical Research Laboratories of the Harvard Medical School at the Massachusetts General Hospital, have tested the efficacy of extracts of the adrenal cortex and posterior lobes of the pituitary gland in the treatment for burn shock in the anesthetized dog; the test objects used were the increased capillary permeability in the burned foot and the changes in intermediary metabolism of protein, carbohydrate and electrolytes induced by the burn.

The threshold of burn trauma which registers as an increase in flow and protein concentration of the lymph draining from the burned foot of the dog was found to be an immersion for 10 seconds in water at 67° C. Minimal and consistent increases were produced by immersion for 10 seconds in water at 70° C. Burns of greater severity are followed by more precipitous and higher rises in lymph flow and protein concentration, more rapid edema formation, and hemolysis.

The possible influence of the glandular extracts on the increased capillary permeability was tested on threshold and minimal burns. No effect of the adrenal cortical extract was demonstrable. The use of posterior pituitary extract was followed by a slight, transitory drop in protein concentration of the lymph. The changes in intermediary metabolism observed following burns also were not influenced by the gland extracts. No evidence was obtained to substantiate the concepts that these glandular extracts are useful in the treatment for burn shock. (Arch. Surg., Nov. '49, O. Cope et al.)

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Study on Cold in Treatment for Thermal Burns: A child soon learns that cold relieves the pain of a burn, and cold has been used since ancient times in the treatment for burns. More recently, at the beginning of the second World War, Webster and others and White and his associates recommended cold in the therapy for immersion foot. They found not only that it relieved the pain but also that it was followed by some reduction in volume of the edema. If such reduction in edema could be achieved in a burn, the use of cold might materially reduce the volume of plasma needed in the therapy for burn shock. There are also theoretic reasons pointing to the use of cold in burns; cold should diminish the metabolic demands of the wound, and if the circulation to the wound is impaired, the degree of tissue damage might be decreased; and bacterial infection should be reduced by the established effect of cold in decreasing bacterial growth. In addition, Drinker and others have stressed the fact that edema may retard the healing of burn wounds; Blalock has reported an increase in survival time of the dog traumatized with a crushing clamp and treated with cold, and F. M. Allen has recommended enthusiastically the use of cold for all forms of trauma. For all these reasons, theoretic and reported, a probe into the rationale for the use of cold in cases of burns was started. The

initial experiments in which lymph flow and edema formation were observed were sufficiently suggestive for the experimental program to be extended to include measurement of the arterial circulation.

Nineteen male dogs in good health weighing from 18 to 22 Kg. were chosen for the experiments. The temperature selected for the cold bath was 10° C., inasmuch as this degree of cooling in itself has been shown to cause no damaging effect on tissues. Exposure to cold alters the pattern of lymph flow and protein concentration. Lymph flow from a burned foot is sharply reduced during the entire period of immersion in the cold bath, regardless of whether cold is applied immediately after the burn or at some interval later. The rise in protein concentration of lymph and in rate of edema formation is also retarded. These changes occur apparently as a result of shunting of blood flow away from the damaged capillaries. On withdrawal of the foot from the cold, the rate of lymph flow and edema formation is accelerated and the rise in protein concentration of lymph resumed until it reaches or even exceeds the levels of the untreated foot. Cold does not alter the pattern of arterial blood flow in the burned foot until removal of the foot from the cold bath is effected. This is in contrast to the pattern of lymph flow, which is strikingly altered only during the period of immersion in the cold. When exposure to cold ceases, there is an immediate rise in blood flow in the treated foot but no striking or consistent change in the untreated foot. This difference in flow pattern in the 2 feet indicates that the rise in blood flow in the treated foot is the result of a reflex locally governed.

In this study, neither the intensity of the burn nor the duration of immersion in the cold bath altered the pattern of response in the lymphatic or arterial circulation. No consistent changes in blood pressure were established during infliction of the thermal injury, in the period immediately following injury, or during therapy with cold.

It is true that the application of cold to a burn wound diminishes the rate of edema formation and therefore the rate of loss of plasma volume and that it may even diminish slightly the volume of edema which has already formed before its application, but it is not necessarily true that cold is a treatment of choice for the burned patient.

Cold retards the loss of plasma volume but does not eliminate it. The wound volume slowly increases while the chilling continues, and although the volume reached may be less than that expected had the wound not been chilled, the authors' experiments do not indicate a sparing of plasma volume adequate to indicate the use of cold on this basis. The sparing of plasma loss is also not a problem in a patient with a circumscribed burn but is most needed in the extensively burned patient. If sufficient cold is applied for a therapeutic effect to an extensive burn of the body surface, it will cause a drop in body temperature. Experiments using cold not cited in the observations of this paper were

carried out on dogs with all 4 legs of each burned; there was such a drop in body temperature that survival was threatened.

It is reasonable to conclude that cold may retard the development of infection and diminish damage from an impaired circulation, but cold also reduces the rate of the healing processes. Tempting though it may be to use cold, in the therapy of burns, it must be recognized that an excessive use of cold with either too severe a cooling application or too long an exposure, may in itself result in tissue damage. Until more is known of the critical temperature and period of exposure which can be employed with safety, it is considered wise to limit the use of cold to the temporary alleviation of the pain of burns of small extent. For this purpose it may be extremely useful. (Arch. Surg., Nov. '49, J. L. Langohr et al.)

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Circulation of the Blood and Lymph in Frostbite and Influence of Therapeutic Cold and Warmth: Frostbite is a common injury of man transposed from temperate to cold climate, yet little is known of the physiologic disturbances it creates, and the treatment for it is still in the realm of empiricism. The adverse effects of this injury assumed special importance during the recent war, when these studies were undertaken.

The resemblance of frostbite to burns, the experimental observations of Lewis and the experience in the early years of World War II in the treatment for immersion foot with cold suggested that the disorder of the arterial and lymphatic circulation induced by frostbite might well be similar to that following burns. Accordingly, as a beginning to a better physiologic understanding and more rational therapy, the experimental studies of the circulatory disturbances of trauma caused by burns were extended to frostbite, including the possible use of cold and warmth in treatment.

Frostbite was produced experimentally by immersing the dog's foot in a liquid mixture of ethyl alcohol and solid carbon dioxide. Different degrees of tissue injury were produced by varying the temperature of the cooling mixture and the duration of the immersion. The abnormalities found are strikingly similar to those following a hot water burn. There is the same evidence of increased arterial blood flow, damaged capillary membranes, and overloaded lymphatic trunks. The only major dissimilarity arises from the fixation of tissues when frozen; blood flow progressively decreases in proportion to the severity of injury and even is arrested if the freezing is deep. It is not until the tissues thaw that the circulatory pattern encountered after thermal trauma manifests itself.

The similarity of the circulatory disorder between frostbite and burns is seen in many of the details. From the frostbitten foot there is invariably an

increase in lymph flow and protein concentration comparable to that following a burn; the onset of flow of abnormal lymph is delayed by freezing and greatly accelerated with thawing. The rise in lymph flow lags behind that of blood flow and reaches its peak at the time of maximum edema. The protein concentration of the lymph rises with the onset of spontaneous flow to levels comparable to those following a burn. The shunting of blood from the damaged capillaries as a result of treatment with cold water at 10° C. occurs after both types of injury. Blood flow, augmented by the injury, is not reduced by the treatment with cold, whereas both the lymph flow and the edema formation are restrained. That this apparent shunting of blood is controlled by a local reflex in both types of injury is suggested by the observation that the restraint of lymph flow and edema formation is not seen in the contralateral damaged but untreated foot. Those who feel that edema is deleterious to a wound may be tempted to use cold in their therapy for frostbite. As in the treatment for burns, the authors are fearful lest prolonged exposure to even such a mild degree of cold as immersion in water at 10° C. would in itself lead to tissue injury.

Except for the acceleration of thawing which it induces, warmth used in treatment does not alter the pattern of circulatory disorder. In the therapy with cold, lymph flow from the treated foot as well as lymph protein concentration and edema formation is retarded. When warmth was used in treatment, the lymph flow and protein concentration of the treated foot increased more promptly than those of the untreated foot. Consistently significant differences in the maximal protein concentrations of the lymph from the 2 feet were not noted. There is no evidence that a shortening of the length of time the tissues stay frozen decreases or alters the nature of the injury to the cells. The authors, therefore, have obtained no evidence pointing to benefit from the use of warmth in the treatment for frostbite. (Arch. Surg., Nov. '49, L. Rosenfeld et al.)

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Explorations into the Physiologic Basis for the Therapeutic Use of Restrictive Bandages in Thermal Trauma: Enthusiastic recommendations for the use of pressure dressings and plaster casts in the local treatment for burns have appeared from a number of clinics. Pressure dressings are advised because they tend to limit swelling of the wound, although plaster casts, if applied immediately after injury, prevent swelling. Although nearly all authors agree that such restrictive dressings are beneficial to wound healing, they have been advocated for a variety of reasons. Allen and Koch hold that an occlusive pressure dressing restores the tissue pressure normally dependent on an intact integument and thus aids in the return of venous blood. They cited Blair as pointing out that pressure limits both venous and lymph stasis. Noticing that the dressings promoted comfort and that the wounds showed minimal infection, Siler and Reid recommended pressure because it tends to prevent the loss of plasma from the circulation, a point on which Koch and others agree. As far back as 1924

Blair used mechanical pressure on wounds because it limited the amount of plastic material that pours into the wound, a point which Drinker and his collaborators have emphasized recently in more finite protein terms. They pointed out that not only does plasma pour out of the circulation through the dilated and permeable capillaries into the wound but also that the proteins of the plasma eventually become coagulated in the interstices of the stretched wound. They stressed the fact that not only must these proteins eventually be redissolved during healing but that the coagulum may serve as a nidus for infection and lead to increased fibrosis and scarring. They also expressed the belief that stretching by edema tears the tissues and leads to scarring.

All these reasons, if proved, should be important in burn therapy. But after the clinical use of pressure dressings at the Massachusetts General Hospital and a critical survey of the literature, 3 reservations seemed indicated. The first, is there a true sparing action on loss of plasma or is the edema fluid merely displaced, and how far can pressure be counted on to limit loss of plasma in the extensively burned patient? It was noted that in patients with burns of the extremities, the pressure of elastic bandages, even though applied well above the burn, often failed to check the appearance of edema in the unburned, unbandaged tissues. If both hands and wrists and the face were burned, for example (areas ideal for pressure bandaging), edema appeared in the upper part of the arms, at the base of the neck and over the chest. The authors' failure to restrain the loss of plasma by pressure could have been caused by an inadequate application of it, a fault which might be corrected by using the plaster dressing as recommended by Drinker. On the other hand, because the edema collected in the unburned tissues, proximal to the burn on the arms and over the upper part of the chest, perhaps it became disseminated because the lymphatic trunks draining the wound were overloaded, a factor which a plaster dressing might improve but not altogether correct. It should be pointed out also that Siler and Reid hesitated to draw a definite conclusion from their experiments aimed at testing the efficacy of pressure dressing in sparing loss of plasma.

The second concerned the rationale. Is the local collection of edema deleterious to wound healing? It has been repeatedly observed at the Massachusetts General Hospital that the swelling of a burn wound may disappear almost as rapidly as it came and that fibrosis, or scarring, is by no means a constant sequel of pre-existing edema. Bleb fluid from a partial thickness burn often fails to coagulate and whether it does or not, it is resorbed in less than 12 days if the roof of the bleb is intact and the wound is uninfected. These findings would not suggest widespread coagulation of protein in the wound spaces in the absence of infection. They would also not suggest that distention of itself tears tissue. The presence of infection, of course, might increase the coagulation <u>in situ</u> of the proteins which have exuded from the blood; but is coagulation so deleterious? Glenn, Gilbert and Drinker offered experiments which they believed point to such unfavorable action. They compare the healing of the 2

feet of the dogs burned equally. One foot of each dog was encased immediately after the injury in either a plaster mold or a light plaster bandage. The control foot was left uncovered. Healing proceeded much more rapidly, with less destruction of tissue and less final scarring, in the foot encased with plaster. The improved healing is unquestioned, but in the appraisal of the result they laid such emphasis on the absence of coagulated protein in the wound that they neglected to consider the mechanical protection offered by the plaster. The cast must have cut down, if not cut out, the repeated bacterial contamination which the uncovered foot received from the skin elsewhere, the tongue, and the cage. If the dog used the foot, the cast should have distributed the pressure and protected the foot from the trauma of licking.

The third reservation concerns the possible harm which might accrue from improper application of a pressure or plaster bandage, a warning stressed by Glenn, Gilbert and Drinker. If the bandage does not include the most distal portion of an extremity, even though unburned, gangrene may result. Because of the haste which necessarily may accompany care of disaster casualties and the length of time needed to apply an effective restrictive dressing, particularly plaster, the virtues of such a dressing must outweigh this danger before such therapy can be recommended.

The authors agree with Levenson and Lund that the reports on the clinical use of plaster bandages, and particularly those of Glenn, Gilbert and Drinker on dogs, were so interesting that a more extended survey of their usefulness should be made. Because some of the supposed advantages and the authors' reservations are not susceptible to controlled testing on chance burns in the human being, experiments on dogs were made following the lead of Glenn, Gilbert and Drinker. Attention has been focused on the arterial and lymphatic circulation and their influence on the state of the wound. The observations bear only indirectly on the nutrition of the wound, for direct methods of sufficient accuracy have not been developed to compare the oxygen tension, for example, of the wound for which there was treatment with a cast with that of the one without a cast.

The experimental exploration into the disordered physiologic changes in the burn wound supported by a rigid plaster of paris dressing recorded in this paper do not provide the unequivocal evidence needed to guide us in the use of pressure dressings in the treatment for burns. Changes encountered immediately after the burn which are apparently in favor of pressure dressings are supplanted with the passage of time. The other factors believed to favor these dressings, such as the decrease in proteins coagulated <u>in situ</u> and localization of infection, are still experimentally unproved.

The most emphasized benefit to be derived from pressure dressings is the sparing of the loss of plasma into the burn wound. However, Siler and Reid,

after their experimental investigation which tended to show such a sparing, wisely pointed out in the discussion that the data they obtained were probably within the experimental error of the method used. Of similar negative value are the findings in this study. At first sight the observation that the lymph flow from a burn wound is reduced by a rigid plaster wall applied immediately after injury should indicate a diminished loss of plasma. As the experiment is followed, however, it becomes clear that the increased flow after burning is not sufficiently reduced by the cast for the lymphatic vessels to be able to carry it. Loss of plasma volume is thus retarded but not eliminated and presumably not reduced. The concentration of the protein in the lymph flowing from the bandaged foot is slightly higher than in that from the foot allowed to swell, which indicates a greater resorption of water into the venous blood. Unable to return to the blood stream all the fluid flowing through the damaged capillaries, the lymph piles up as edema in the interstitial spaces proximal to the cast. With the passage of time this edema may slowly reach the volume it would have been had the restricting dressing not been applied. Although in the first hours the volume of plasma lost may be reduced, it appears that eventually it may be the same as in the wound not treated with a cast. More quantitative evidence is, however, needed on this point.

The protein concentration of exudate fluid seeping out onto the surface of the burned skin is slightly lower than that of the lymph flowing from the same wound. This indicates either that water is resorbed from lymph, lymph being more concentrated than extracellular tissue fluid, or that part of the protein of the tissue fluid is strained as the fluid seeps through the skin. If the latter were true, the concentration of protein in the bleb fluid of a burn in the human being might be lower than that of the subcutaneous edema fluid.

The observations that the venous pressures and the arterial blood flow to a burn wound are not reduced and that the arteriovenous oxygen difference is not altered by the plaster dressing suggest that no harm accrues to the wound's circulation and nutritional environment from the restricting pressure. Tissue pressure, measured as the pressure between skin and plaster bandage, approached but never reached mean arterial blood pressure. Arterial blood therefore does not flow against a rigid wall, the outflow of venous blood and lymph providing some elasticity. It is possible that the benefit which clinically appears to accrue from the use of the restrictive dressings comes from the immobilization of the wound provided by the dressing. Motion of the burn wound increases lymphatic flow and displaces edema proximally in the interstitial spaces. These both have the effect of lowering the tissue pressure in the wound, which permits augmented seepage out of the capillaries. Because of these effects of motion and because the loss of plasma is retarded, restrictive, immobilizing dressings are presumably indicated in the care of burn wounds. They must not be used, however, with the idea that the need for plasma therapy in burn shock will be materially reduced. And whether the benefit from their use

outweighs the danger of gangrene from improper application, particularly that of the plaster dressing, will depend on the intelligence with which such dressings are used. (Arch. Surg., Nov. '49, F. W. Rhinelander et al.)

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Chlordane Effective in Cockroach Control: Cockroaches have not been successfully implicated in the direct transmission of any specific diseases. However, from a sanitary standpoint to lessen the possibility of mechanical transfer of infectious material, and from an aesthetic standpoint, their control is an important problem of the medical department of any station. Only recently, after a prolonged search has the control of these pests been successful at the Naval Auxiliary Air Station, Oceana, Va.

The usual insecticidal compounds were carefully screened for effectiveness in various combinations, but at best their use only resulted in a temporary decrease in the cockroach population. About 18 months ago, it was found that in spite of the control measures being taken, the mess hall and galley were being overrun.

The mess hall and galley at this activity are constructed of war-time cinder blocks with a fibreboard finish. A thorough examination confirmed the supposition that the pores of the cinder blocks as well as the joints between the strips of fibreboard were furnishing optimal breeding and hiding places.

Fair control was accomplished during the first 10 months of the period by spraying heavily with 10 percent DDT in standard Navy insecticide once a week using a quart size paint sprayer and 60 lbs. of air pressure. However, the equipment, particularly the compressor, was cumbersome and, because of the construction of the buildings, insecticidal concentration in all areas was not attained unless the operating personnel were very conscientious and thoroughly sprayed all cracks and crevices. A lapse of one or 2 weeks without spraying resulted in a marked increase in the cockroach population, indicating that the mixture did not either penetrate the egg packets or cause a high kill by its DDT residual effect.

In making further studies, it was discovered that chlordane (12 percent octachlore 4,7 methane-tetrahydroindane, and 8 percent related compounds in an oil-soluble base) was being employed to advantage at other activities. Because the compound is not yet available in standard Navy supply, it was necessary to procure it through open purchase at a local agricultural supply house.

For the succeeding 2 months a solution of 2 parts of the 20 percent chlordane with 10 parts DDT in sufficient standard Navy insecticide to make 100 parts was used at weekly intervals to spray the mess hall and galley. Subsequently, only a few cockroaches were observed at these places. However, if

one week was let go by without spraying, the cockroach population again increased markedly.

In February 1949, in order to screen the effectiveness of the chlordane itself, the DDT was omitted from the above mixture and one part 20 percent chlordane plus 9 parts standard Navy insecticide was employed; these proportions give a final concentration of 2.00 percent of the active principle (which represents the maximum strength as presently recommended by BuMed). During the 6 months following, the results were gratifying; for the first 3 months, messing areas were sprayed weekly and it was reported that only an occasional roach had been seen on several consecutive sprayings. Consequently spraying was reduced to every other week and the same degree of control was observed. The degree of control attained with this solution was such that it was decided to reduce the concentration of the chlordane to one part in 32 parts standard Navy insecticide (20 oz. to 5 gal.). Over a period of 2 months it was found that the lesser concentration was not effective and the stronger solution was re-employed.

Excellent roach control at the canteen, galley, mess halls, and ship's service is now being maintained by light spraying every other week with one part chlordane in 10 parts standard Navy insecticide.

For the past several months, a simple type of hand sprayer has been used at this activity. It consists of (1) a 1/4 H. P. Craftsman Compressor Paint Spraying Unit, Model No. 283-1854 (obtainable at Sears Roebuck at a cost of $53.00) which comes equipped with a quart capacity hand gun paint sprayer and a short length of air hose, plus (2) an additional 75 feet of air hose which was obtained through the Public Works Department and connected to the apparatus by the station pipe-fitters.

The addition of the extra air hose to the compressor unit facilitates operation by making it possible to spray along all the cracks, crevices, and other cockroach hiding places without moving the unit. (Chlordane must not be used as a space spray or to treat entire surfaces of bulkheads and overheads because of its too prolonged fumigant action which might constitute a hazard to human beings, particularly in places where children of crawling age might be exposed.) (S. M. Peabody, Lieut. Comdr., MC, USN and A. S. Evans, HMC, USN)

Note: Chlordane is not yet on the supply table. However, specifications are now being written for its acquisition for supply through the Navy, and a BuMed circular letter will be issued regarding the recommendations and specific directives for its use. In the meantime, activities contemplating the use of chlordane can obtain it on open purchase and should write to BuMed, Attention Code 72 for complete instructions for its use. --Preventive Medicine Division, BuMed.

Effect of Ultra-Violet Irradiation of Classrooms on Spread of Mumps and Chickenpox in Large Rural Central Schools: The purpose and general plan of this study have already been described in detail in a preliminary report dealing with the experience in the measles epidemic of 1945-1946. The same 3 schools have been kept under observation, the same care in regular cleaning and checking of the germicidal lamps has been maintained, and the same methods of compiling the epidemiological data have been used throughout.

The Cato-Meridian School is still fully equipped with ultra-violet lights. In Port Byron, all places of common congregation and the classrooms housing one section of each grade through the eighth are still irradiated, although classrooms with other sections of the corresponding grades have no ultra-violet lamps and thus serve as controls. The Mexico School, with no ultra-violet lamps, still serves as a wholly unirradiated control school.

Two minor technical improvements were made early in the school year of 1946 - 1947. A fixture design was developed which made irradiation of the gymnasiums feasible, and the reflectors in the deep-trough corridor fixtures were modified so as to insure a level of radiant energy in the corridors equivalent to that in the classrooms. During the measles epidemic, the gymnasiums had not been irradiated and the corridor fixtures were somewhat less efficient than those in the classrooms. Otherwise, the procedure as described has been followed consistently in every respect.

When the epidemic of measles occurred, it affected all 3 schools during the same school year. Sizeable outbreaks of both mumps and chickenpox have occurred in the partially irradiated school at Port Byron. Likewise, mumps and chickenpox have each been epidemic once in fully irradiated Cato-Meridian, and 2 outbreaks of chickenpox have occurred 2 years apart in the wholly unirradiated control school at Mexico. With full cognizance of the limitations and pitfalls of epidemiological data not compiled at the same point in time, some of the salient features of these epidemics are presented.

These analyses of epidemics of mumps in 2 of the centralized schools under study offer no incontrovertible evidence that ultra-violet lamps in the classrooms modified the spread of the disease in those classrooms. This finding may indicate that ultra-violet irradiation is ineffective in controlling the spread of mumps, or it may mean merely, as some authorities believe, that mumps is not an air-borne infection. On the other hand, the differences in the rate of spread of chickenpox, with low-grade protracted epidemics in irradiated individuals and more explosive episodes in unirradiated controls, may be caused by the presence of the ultra-violet radiation. A similar interpretation was suggested in the prior report dealing with measles. The observation of 2 extremes for no demonstrable reason in the wholly unirradiated control environment does not invalidate the above premise, but it does emphasize the fact that an endemic type of spread may result from other inapparent causes. And, above all things, it

points to the extreme degree of variation of disease patterns and the need for study of several epidemics of each disease in each environment before any definite conclusions are justified. One consistent finding in all of the outbreaks observed thus far merits emphasis; the shorter, sharper type of outbreak has never been encountered in an irradiated environment. This may be an effect of the ultra-violet radiation in the atmosphere. The findings presented suggest that failure to observe protection against mumps and chickenpox among pupils in unirradiated classrooms as compared to those in irradiated rooms cannot be explained on the basis of exposure within the school buses. It is possible that the significance of the buses may be better evaluated, however, when further data have been compiled with the air in them under treatment with bactericidal vapors. The Port Byron buses are now equipped with vaporizers which dispense triethylene glycol whenever the bus is in operation. Also, as of the current year, observations in another school in the same area have been started. The entire school building and the buses are equipped with triethylene glycol vaporizers instead of ultra-violet lamps, but the same methods of study are being used as have been used throughout in the ultra-violet experiment.

Although the main purpose of the experiment as presently conducted has been to test the possibility of controlling the spread of measles, mumps, and chickenpox in rural centralized schools by ultraviolet irradiation of classrooms, the opportunity for obtaining data on absence caused by nonspecific respiratory diseases has not been overlooked. It is hoped to report these data at some time in the future.

This study has not been conducted with the idea that it is desirable to prevent the spread of measles, mumps, or chickenpox in school children. These diseases were selected merely as good workable criteria to test the effectiveness of ultra-violet irradiation of classrooms in controlling the spread of airborne infection in centralized rural schools. (Am. J. Pub. Health, Oct. '49, A. M. Bahlke et al.)

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Course in Bone Bank Technic for HC: A specialization course for enlisted personnel of the Hospital Corps in Bone Bank Technic has been established at the U. S. Naval Hospital, National Naval Medical Center, Bethesda, Maryland, as set forth in Circular Letter 49-150 on page 35.

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Schedule of Oral Examinations of the American Board of Internal Medicine for 1950: The Bureau of Medicine and Surgery has received an announcement from the American Board of Internal Medicine in which is set forth the following schedule of oral examinations for the year 1950:

Dates	Places
8-10 February	Chicago, Illinois
13-15 April	Boston, Massachusetts
21-23 June	San Francisco, California

Oral examinations in the subspecialties will be held conjointly with the regular oral examinations in internal medicine. (Professional Div., BuMed)

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Examinations for Appointment in Navy Medical Corps: Examinations for the selection of candidates for appointment to the grade of lieutenant (junior grade) in the Medical Corps of the Navy will be conducted at all naval hospitals in the continental United States during the period 16-20 January 1950.

Graduates of approved medical schools in the United States or Canada who have completed intern training in accredited hospitals or who will complete such training within 4 months of the date of the examination, and who are physically and otherwise qualified, may be examined for appointment as lieutenant (junior grade) in the Navy Medical Corps. Candidates must be less than 32 years of age at the time of appointment.

Candidates will be required to appear before boards of medical examiners and supervisory naval examining boards at the naval hospital nearest their place of residence to demonstrate their physical and professional qualifications for appointment. Following approval by the President of the United States and confirmation by the Senate, selected candidates will be issued appointment and orders assigning them to duty in a naval medical facility for active naval service.

As a result of legislation by the U. S. Congress, a lieutenant (junior grade) in the Navy Medical Corps receives $100 a month in addition to the usual pay and allowances of that rank.

Detailed information concerning the form and procedure of application may be obtained from the nearest Office of Naval Officer Procurement or from the Bureau of Medicine and Surgery, Navy Department, Washington 25, D. C. (Attn: Code 3424).

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Duty for Dental Officers, USNR: "Appropriate duty" (with pay) for Naval Reserve dental officers is available at Naval Reserve Training Centers in some naval districts. Dental officers performing this duty, in addition to being reimbursed for their services, are also earning retirement points. The primary duties of these dental officers are to conduct dental examinations and to maintain the dental records of the Reserve in a current status. Each appropriate

duty period must be of at least 2 hours' duration. Only one period of duty may be performed during any one week and not more than 48 may be performed in a fiscal year. Reserve dental officers living in the vicinity of a Naval Reserve Training Center may contact the commanding officer for further information.

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Reserve Dental Officers Attend Course: Forty-three Reserve dental officers attended the course in "Medical Aspects of Special Weapons and Radioactive Isotopes" given at the Naval Medical School, National Naval Medical Center, Bethesda, Maryland, during the period 14-18 November.

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BUMED CIRCULAR LETTER 49-146 9 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Stations

Subj: Insecticide Aerosol for Use on Naval Aircraft

Ref: (a) BuMed CircLtr 49-87 of 13 Jul 1949; N. D. Bul of 15 Jul 1949, 49-494
(b) BuMed CircLtr 49-122 of 29 Sep 1949; N. D. Bul of 30 Sep 1949, 49-689

1. Reference (b) is hereby canceled. Paragraph 4 of reference (a) is also canceled and shall be superseded by the following:

"4. In the event that aerosol insecticides that meet the specifications of reference (d) are not available, refilled bombs may be procured at the nearest refilling facility, locations of which are as follows:

(1) USNSD, Great Lakes, Illinois
(2) USNSD, Newport, Rhode Island
(3) USNSD, San Diego, California
(4) USNSC, Oakland, California
(5) Charleston Naval Shipyard, Naval Base, South Carolina
(6) New York Naval Shipyard, Brooklyn 1, New York
(7) San Francisco Naval Shipyard, San Francisco, California
(8) Puget Sound Naval Shipyard, Bremerton, Washington
(9) USNSC, Guam, Marianas Islands
(10) MCAS, Cherry Point, North Carolina
(11) Norfolk Naval Shipyard, Norfolk, Virginia"

C. A. Swanson

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BUMED CIRCULAR LETTER 49-147 14 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Annual Syphilis Report, NAVMED-A (Rev. 8-45); Submission of

Ref: (a) Par. 35D4, M.M.D.
(b) Annual Syphilis Report NAVMED-A (Rev. 8-45)

Encl: (1) Outline of additional data required for the back of the Annual Syphilis Report NAVMED-A (Rev. 8-45)

It is stated in this letter, a copy of which appears in the 15 November Navy Department Bulletin, that in previous years many activities have submitted the Annual Syphilis Report, NAVMED-A (Rev. 8-45), improperly completed. The Bureau requests that care be exercised in preparing this form, particularly with regard to certain specific items as set forth. This letter also directs that upon its receipt (1) the Health Records of all individuals with a history of syphilis shall be reviewed and serological tests for syphilis and spinal fluid examination on each individual, if required, shall be completed insofar as possible prior to 31 December 1949, and (2) in order to obtain these data for personnel who are in a transient status on 31 December 1949, the Health Records of all men reporting on board between 31 December 1949 and 1 March 1950 are to be reviewed and if found to have been in a transient status on 31 December 1949, these cases shall be recorded on a supplementary form NAVMED-A and submitted to the Bureau of Medicine and Surgery not later than 15 March 1950.

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BUMED CIRCULAR LETTER 49-148 14 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Sanitary Reports

Ref: (a) Manual of the Medical Department, 1945, Part III Chapter 5D, Section I Paragraph 35D5, Sections II and III (entire sections)

Encl: (1) Instructions for preparation and submission of sanitary reports

1. Reference (a) is in the process of being revised. Pending revision of reference (a), Sanitary Reports shall be prepared and submitted in accordance with instructions contained in enclosure (1).

2. Attention is specifically directed to the revision in paragraph 3 of enclosure (1) requiring submission of Sanitary Reports from shore stations semiannually instead of quarterly. C. A. Swanson

Note: Because the enclosure consists of 12 and 1/2 pages, it is not reproduced here. The letter together with the enclosure appears in the 15 November Navy Department Bulletin.

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BUMED CIRCULAR LETTER 49-149 15 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Special Dental Treatment for Personnel at Outlying Stations

Ref: (a) Par. 12B16.4 Manual of the Medical Department, 1945
(b) Par. 21124 Manual of the Medical Department, 1945

1. The number and cost of requests for special dental treatment from civilian sources being received in the Bureau of Medicine and Surgery are rapidly increasing. These requests are for enlisted personnel and officers of the regular Navy and Marine Corps and the Naval Reserve, who are on active duty, in areas where the services of naval dental officers are not available. This is evidence that references (a) and (b) are not being complied with before personnel of the Navy and Marine Corps are transferred into these areas. It is therefore directed that commanding officers, medical officers, and dental officers comply with the provisions of these two references.

2. An analysis of the requests for special dental treatment from civilian sources, which are received for Naval Reserve personnel who are on active duty, indicates that the dental conditions for which this treatment is requested usually existed before they came to active duty. It is therefore further directed that the spirit of references (a) and (b) be applied to Naval Reserve and Marine Corps Reserve personnel who are being considered for assignment to active duty and that those who may require any dental treatment not be placed on active duty if such duty will be at an activity where dental treatment from a naval facility is not available or, in any case, if dental prosthetic replacements for missing teeth are needed.

3. The following are quotations from references (a) and (b): "12B16.4. Whenever practicable, officers and men ordered to ships or stations where the services of a naval dental officer will not be available, shall be referred to a naval dental officer for an examination and necessary treatment before proceeding to such ship or station for duty." "21124.--All enlisted men to be assigned

duty at recruiting stations must be free of dental disease. Each man prior to transfer to such duty shall be examined by a dental officer, who shall make an entry over his signature in NAVMED-H-4 (Dental Record) that the man is dentally fit or unfit." C. A. Swanson

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BUMED CIRCULAR LETTER 49-150 15 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Bone Bank Technic; Hospital Corps Specialization Course in

Ref: (a) Catalog of Hospital Corps Schools and Courses

1. A specialization course for enlisted personnel of the Hospital Corps in Bone Bank Technic is hereby established at the U. S. Naval Hospital, National Naval Medical Center, Bethesda, Maryland, and shall be made a part of reference (a).

2. The length of the course shall be 16 weeks of 40 hours each for a total of 640 hours. Classes of instruction will commence on 14 November 1949, and approximately each 4 months thereafter.

3. The number, ratings, and service requirements of students assigned will be incorporated in Bureau of Naval Personnel quota orders. Hospital corpsmen satisfactorily completing the prescribed course of instruction will be issued a Certificate of Graduation and officially designated Bone Bank Technicians.

4. This procedure is in accordance with the Navy personnel accounting system and the "Manual of Enlisted Navy Job Classifications." C. A. Swanson

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BUMED CIRCULAR LETTER 49-151 15 November 1949

From: Chief, Bureau of Medicine and Surgery
To: Commandants, All Naval Districts (Except 10, 14, 15 and 17), River Commands, Chief of Naval Air Training, and All Shore Stations (Continental U.S.) having Medical Officers

Subj: Selection of Hospital Corpsmen for Training in Medical Department Technical Specialties

Ref: (a) Catalog of Hospital Corps Schools and Courses

1. Reference (a) lists the technical courses of instruction available to enlisted Hospital Corps personnel.

2. The Bureau views with alarm the lack of interest exhibited by medical officers, and other representatives of the Medical Department, in the selection of hospital corpsmen for training in Medical Department technical specialties. Authorized training quotas are regularly being issued by the Bureau to the commandants of the naval districts and river commands, and to other administrative commanders, for transfer of hospital corpsmen to courses of instruction in the Medical Department technical specialties, and these quotas are not being filled.

3. The most common reason advanced for nonfulfillment of training quotas is lack of a sufficient number of volunteers. The value of procurement of volunteers to fill training quotas, in lieu of drafting likely candidates, is fully appreciated. The Bureau strongly advocates the principle of procurement of volunteers for special training, but it is considered probable that in many instances the lack of volunteers is directly the result of the reluctance of department heads to publicize the availability of these training courses, and to recommend personnel for special training, for fear of losing their services.

4. The high rate of failure of personnel to complete courses of instruction to which assigned indicates that immediate corrective measures are necessary. The practice of assigning the least fitted personnel to fill training quotas is deplorable and will not relieve the shortage of trained technicians in the critical technical specialties.

5. The problem of obtaining adequate enlisted Hospital Corps technicians must be appreached from a long range viewpoint and will require the full cooperation of all hands. Therefore, the Bureau directs that this letter be given wide distribution and that strong efforts be made by all Medical Department officer personnel to interest suitable enlisted hospital corpsmen in pursuing training in technical specialties in which they show aptitude. C. A. Swanson

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BUMED CIRCULAR LETTER 49-152 18 November 1949

From: Chief, Bureau of Medicine and Surgery
To: Hospitals, Dispensaries, and Stations having a Dispensary

Subj: Dependent's Identification Card, NAVMED-562; Return of Excess Stock

1. This Bureau has been working with the Bureau of Naval Personnel in revising the Dependent's Identification Card, NAVMED-562 which will be transferred to the cognizance of BuPers early in 1950. This revised NAVPERS

card will be utilized for the identification of dependents at naval medical activities and for other purposes in connection with the identification of dependents.

2. In view of the early replacement of the NAVMED-562 by a NAVPERS form, it is requested that addressees reduce their stock on hand to a maximum of three months' supply. Quantities in excess of this amount should be returned immediately to the appropriate district publications and printing office.

C. A. Swanson

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BUMED CIRCULAR LETTER 49-153 18 November 1949

From: Chief, Bureau of Medicine and Surgery
To: Commandants, All Naval Districts (less 10, 15 and 17)
Commandant, Potomac River Naval Command
Naval Medical Supply Depot, Brooklyn, New York
Naval Medical Supply Depot, Oakland, California

Subj: Medical Allowance for Naval Reserve Training Activities (less Aviation) - Modification to

Ref: (a) BuMed Circular Letter No. 49-115 dated 20 Sep 1949

1. Enclosure 1 to reference (a) is hereby modified as follows:

a. In item description, stock number 7-850-010, delete the word "Filler".

b. Delete in its entirety, stock number 7-850-020, Binder, Manual of the Medical Department and all quantities thereafter.

C. A. Swanson

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BUMED CIRCULAR LETTER 49-154 18 November 1949

From: Chief, Bureau of Medicine and Surgery
To: Ships and Stations having a Representative of the Medical Department Aboard

Subj: Individual Statistical Report of Patient (NAVMED-F); Revision of

Ref: (a) Manual of the Medical Department, Chapter 23, Section I; (Revised 1949)

Encl: (1) NAVMED-F card Instruction Booklet
(2) Examples of completed NAVMED-F forms
(3) Ten NAVMED-F forms (revised)

1. Reference (a) promulgates new instructions for the preparation and submission of the Individual Statistical Report of Patient (NAVMED-F). These instructions will become effective on 1 January 1950, and all reports for transactions on the sick list occurring on and after that date will be submitted in accordance with reference (a). New reporting forms (NAVMED-F, Revised), samples of which are enclosed, will be put into use concurrently.

2. The following steps will be taken in order to implement reference (a):

a. Addressees will immediately requisition from the appropriate distribution point supplies of the revised NAVMED-F to meet their needs. Attention is invited to the fact that the paper file copy (old NAVMED-F) has been discontinued, and that both the Bureau and file copies will henceforth be made on identical forms.

b. All reports for transactions on the sick list occurring through 31 December 1949 will be made on old forms and in accordance with current instructions. Remaining stocks of old NAVMED-F and NAVMED-Fa forms will then be destroyed.

c. It will not be necessary to make special reports on 1 January for patients remaining from the preceding year. Instead, reference (a) regarding such patients will be complied with.

d. All reports which include transactions occurring after 31 December 1949 will be made on new forms and in accordance with reference (a). It is expected that, in some instances, this will result in duplication of information which may already have been submitted on old reports during 1949.

3. It will be apparent from reference (a) that the new system results, with rare exceptions, in the submission of a single report for each case incidence of disease or injury rather than, as in the old system, of a report for each transaction on the sick list. It is anticipated that this will effect a substantial saving in work-load. Although the submission of reports is tied to the termination of diagnoses, it is still desired to have available information about other transactions on the sick list. Therefore, the instructions provide that each report submitted shall give a summary of the events occurring to the patient during his stay on the sick list, or since the last report was submitted. Enclosure

(2) includes examples that will illustrate the correct method of preparing NAVMED-F (revised).

4. It is requested that the widest possible dissemination of this letter be made within each activity. Additional copies of enclosure (1) may be obtained from the Bureau. --C. A. Swanson

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BUMED CIRCULAR LETTER 49-155 23 November 1949

From: Chief of the Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Laboratory Examination, NAVMED-HF-27, Installation of Standard Forms to Replace

Encl: (1) List of standard laboratory forms

This letter which appears in the 30 November Navy Department Bulletin states that the Bureau of the Budget has approved and directed the use of a series of standard clinical forms, effective 1 January 1951, and gives instructions concerning the acquisition and use of these new forms.

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BUMED CIRCULAR LETTER 49-156 23 November 1949

From: Chief, Bureau of Medicine and Surgery
To: All Activities with Medical Department Representative

Subj: Report of Surgical Operations (NAVMED-Form-P); Revision of

Ref: (a) Joint Armed Forces Basic Diagnostic Nomenclature and List of Surgical Operations
(b) Manual of the Medical Department, paragraph 5113

Encl: (1) Supply of NAVMED Form-P

1. Transmitted herewith are supplies of revised Report of Surgical Operations (NAVMED Form-P). These revised forms will supplant old NAVMED Form-P effective immediately, and stocks of old forms will be destroyed upon receipt of this letter. Reports covering the calendar year 1949 will be made on enclosed forms, and should be forwarded no later than 15 January 1950.

2. Attention is invited to the fact that operations are to be recorded in terms listed in reference (a), and in order by code number rather than alphabetically as in the past.

3. Changes will be made in reference (b) in a forthcoming revision.

C. A. Swanson

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NAVY DEPARTMENT
BUREAU OF MEDICINE AND SURGERY
WASHINGTON 25, D. C.

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